

A C-Band Radio Frequency Interference (RFI) Detection and Mitigation Testbed, Phase I

Completed Technology Project (2005 - 2005)



Project Introduction

Radio Frequency Interference (RFI) can render microwave radiometer measurements useless. We propose a method and an architecture that can be used to identify sources of RFI and be used to identify an optimal scheme for the mitigation of RFI. The system consists of a fully functional digital radiometer that can collect data in the field and pipe the pre-detected signal into, for example, a spectrum analyzer for in-situ analysis or into removable flash memory for later analysis. The digital radiometer employs a Field Programmable Gate Array (FPGA) for employing flexible mitigation strategies. It will also use a programmable noise source for generation of artificial RFI in the laboratory setting, allowing for efficient mitigation algorithm development in a laboratory setting, independent of actual RFI, which may be intermittent. Thus this one instrument can be used to identify RFI, develop mitigation approaches for RFI, and validate the mitigation strategy. A flexible system is essential for this task since RFI takes many forms.

Anticipated Benefits

Aerospace corporations, Universities, government agencies other than NASA, and international groups also construct radiometers that could benefit from the results of this technology. Indeed, RFI mitigating radiometer technology developed by NASA will increasingly be exploited by other institutions, especially as enabling technologies like validated RFI mitigation techniques are developed. These institutions known to the authors to manufacture radiometers include, but are not limited to, Aerospace Corporation, ProSensing, Inc., Radiometrics, Inc., U. S. Navy, NOAA Environmental Technology Laboratory, The University of Michigan and The University of Massachusetts.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

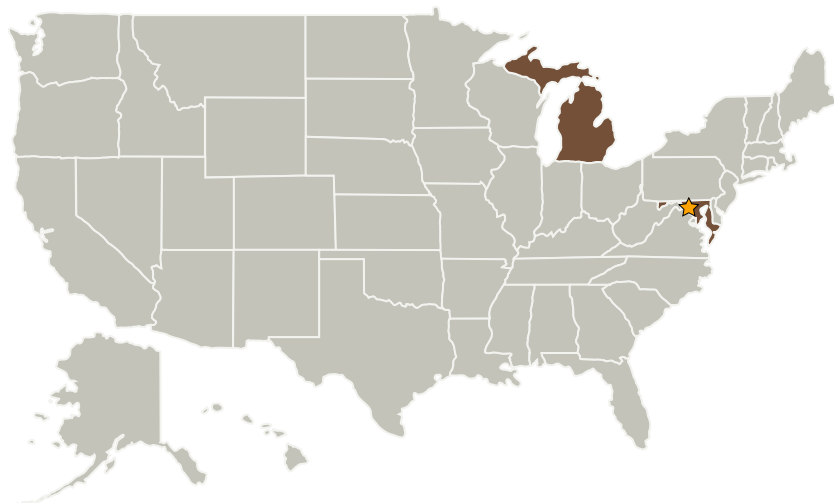
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
EMAG Technologies, Inc.	Supporting Organization	Industry	Ann Arbor, Michigan

Primary U.S. Work Locations

Maryland	Michigan
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Joe Knuble

Principal Investigator:

Kazem Sabet

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - TX05.2 Radio Frequency
 - TX05.2.1 Spectrum-Efficiency